

INTRODUCTION

The P147-30 is an advanced digital frame store synchronizer and time base corrector, with inbuilt facilities for digital manipulation designed to produce a range of visual effects. It has two full fields of memory, and can therefore be considered as an infinite-window TBC. Timing discrepancies between the video input and a reference video system are corrected, and the output signal is completely free from time base errors. The need for advanced sync references to VTRs is eliminated, allowing complete correction of non capstan-servoed machines.

On its own, the P147-30 is capable of producing various digital effects such as QUANTIZATION, FALSE COLOUR IMAGING, PIXELATION, and PICTURE FREEZE. Using an external effects controller, the range of effects is significantly extended to include size and position manipulation, slides, inversions, and the addition of borders adjustable in size and colour.

Facilities

Frame Synchronization

The video input may be derived from any source nominally conforming to the particular unit's TV standard. Its timing and phase relationship to the reference video system is irrelevant - the P147-30 provides total synchronization with a local reference or, if a reference is not available, with its own internal sync generator. Direct switching between remote, unrelated sources is completely masked and causes no disturbance of the output signal.

Input Error Detection

Momentary disruptions in the input signal - such as result from bad VTR edits - are automatically masked by rejecting the disrupted field(s) and temporarily freezing the last available good field. Similarly, if the input signal is removed or falls below an acceptable level, the last good field is automatically frozen until the signal is restored.

Input Level Control

The unit can accommodate input signals with a wide range of black, luminance and chrominance levels, and still maintain a consistent quality of output signal. Front panel controls with overload indicators and calibration presets are provided for independent adjustment of input amplifier gains.

Freeze Facilities

The output signal can be 'frozen' to display a single full frame (two interlaced fields), or a frame consisting of a single field used twice. Frame freeze provides maximum vertical resolution: field freeze reduces vertical resolution by half but eliminates the possibility of flicker caused by image movement between fields.

While the system is in freeze condition, single new frames can be 'grabbed' on a one-shot basis or at regular intervals by an adjustable front-panel timer control. The interval between timer-controlled grabs is continuously adjustable from about 10 seconds to the equivalent of normal field rate.

Automatic field or line freezes occur in response to a number of input signal error conditions monitored by the input error detection system. Such a freeze will last as long as the error condition persists.

Power-Down Detection

Whenever mains power fails or is removed from the P147-30, the input video and main output signal sockets are automatically interconnected to prevent a complete loss of output signal. The same state can be initiated manually by the front panel BYPASS pushbutton.

Effects

The P147-30 has internal facilities for producing three visual effects - pixelation, quantization and false colour imaging.

Pixelation

Pixelation produces a mosaic effect by reducing the picture to rectangles of variable size. The vertical size is fixed, but horizontal size is switch-selectable from 114 elements to 16 elements per line.

Quantization

The quantization control produces an effect commonly known as solarization or posterization. It uses a process of progressively reducing the number of discrete luminance level values in the digitised signal from the 128 required to produce a normal gradation, to as few as two levels.

False Colour Imaging (FCI)

The original chroma information is replaced by false colours related to luminance level. Four alternative switch-selectable colour schemes are provided, including one with saturated primary and secondary colours only.

Externally-Controlled Effects

As a stand-alone unit the P147-30 offers a useful range of effects to enhance its primary function of video source synchronization. When combined with other CEL units - in particular, Maurice (P152) - it becomes part of a truly versatile system capable of a wide range of sophisticated digital effects. Various examples of system configurations involving P152 and other units are given in the appendix to this guide, but the diagram below shows the essentials of a P147-30-based effects system.

In such a combination, the full power of the P147-30 as an effects generator is realised. Full details of the additional effects available can be found in the P148 Operators' Guide but, briefly, they include:

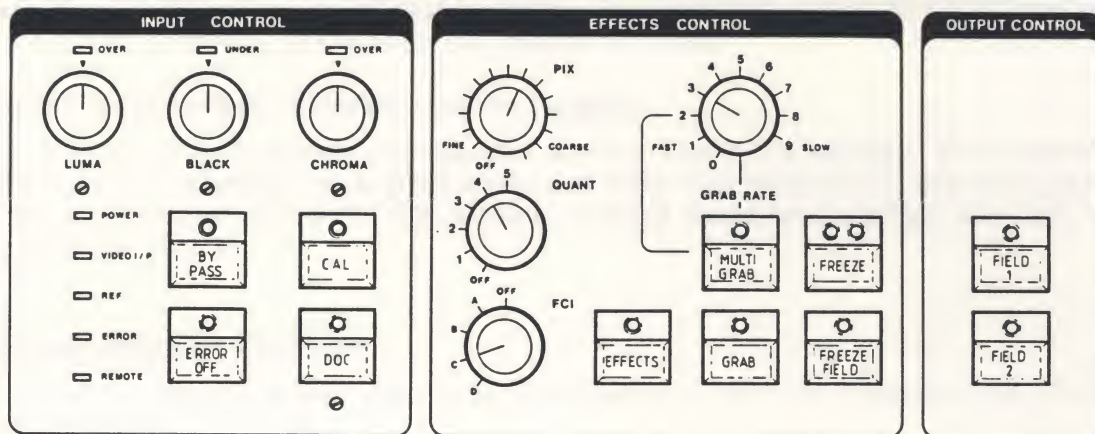
- Picture bordering with borders of adjustable colour and size
- Horizontal and vertical slides
- Quad picture montages
- Quarter-size compression
- Zooms
- Variable picture size (to 1/64 vertically and 1/128 horizontally)
- Independent horizontal and vertical compression
- Vertical page folds and flips
- Picture inversion
- Multiple picture montages

Any of these effects, as well as all of the standard facilities of the P147-30, can be controlled from Maurice's simple-to-use touch screen.

OPERATION

This section first gives brief details for operating the P147-30 in its basic role of an automatic synchronizer/time base corrector, and for using its effects capability. Detailed descriptions of all front panel controls and indicators are then given (starting on page 2-2), which may be used as a reference, and should be read in conjunction with the procedures given below. It is assumed that the system has been installed and set up correctly as described in section 3. If this is not the case, the instructions and advice given there should be followed before proceeding.

P147-30 DIGITAL FRAME STORE SYNCHRONIZER-TBC AND EFFECTS SYSTEM.



Switching On

The power on/off switch is located on the rear panel adjacent to the a.c. mains connector. When switched on, the P147-30 will assume a standard start-up condition in which there are no effects (including freezes) applied, and the POWER and CAL indicators are illuminated. Provided a satisfactory video input signal is present, the VIDEO I/P indicator will also be illuminated and the signal will appear at the unit's output. If not, the indicator will be off and the output will assume a static random state consisting of a pattern of mauve and green stepped bars at maximum chroma excursions. Where a satisfactory reference video signal is also available the REF indicator will be illuminated. Otherwise, the indicator will be off and the input video will be synchronized with the internal SPG.

Automatic Synchronization and Time Base Correction

By definition, synchronization and time base correction are automatic and no operation is necessary other than to ensure that the unit is switched on and that the input controls are set as required.

For normal operation, check that the CAL button lamp is on and that the BYPASS, ERROR OFF, FREEZE, EFFECTS, and FIELD (output control) button lamps are off. Check also that the VIDEO I/P and REF INDICATORS are on, indicating that the reference and unsynchronized video signals are present. In this condition, there will be no effects applied, and the unit will automatically perform its basic functions of synchronization and correction, and of detecting and freezing out input signal errors as determined by the setting of the error detection switches during installation.

Provided the input signal luminance, chrominance, and black levels are similar to those used when setting up the preset input controls, there should be no need to use the LUMA, BLACK, or CHROMA controls. If not, and there is any significant level error in output signal, de-select the CAL button (lamp off) and use the controls to correct the output as necessary. Black level should always be set before finally adjusting LUMA.

Using Effects

Manual Freezes

To freeze the output manually, simply select the FREEZE button (lamp on). The output signal will be frozen instantly regardless of whether the EFFECTS button lamp is on or off. If the FREEZE FIELD button lamp is off the output will be a complete frame, and there may be inter-field jitter if there is significant movement between the two fields involved. Press the FREEZE FIELD button if necessary to eliminate such jitter.

Grab and Multi-Grab

While a manual freeze is applied, the output can be updated on a 'one-shot' basis by pressing the GRAB button, or at regular intervals by selecting MULTI GRAB and setting the GRAB RATE control to the required update interval.

Pixelation, Quantization, and False Colour Imaging

All three effects are enabled and disabled by the EFFECTS button. The controls can therefore either be preset to a given level and then switched in and out as required, or they can be advanced with EFFECTS already enabled to achieve a progressive and visible increase in the effect.

Control and Indicator Functions

The following paragraphs give details of the functions and inter-relationships of all front panel controls and indicators.

Indicators

POWER

This indicates when a.c. mains power is applied and the mains switch at the rear of the unit is on.

If the indicator is not lit, the P147-30 will be bypassed by the internal relay which connects the VIDEO INPUT to the MAIN output.

VIDEO I/P

This indicator lights when the unsynchronized video is present and detected. It is useful in determining the stability of the input video source: any flickering of the lamp normally indicates severe disruption of the signal and checks should be made on the signal level, source material etc.

REF

This indicator lights to show that a reference video is present. As in the case of VIDEO I/P, any flickering of this lamp indicates severe disruption of the signal, and measures should be taken to remedy the problem.

ERROR

This indicator is normally off, but lights whenever errors are detected in the unsynchronized video input signal. Depending on the configuration of the error control switches (see User Presets) and the duration of the errors there may or may not be apparent picture freeze effects when the indicator is on.

REMOTE

This indicator lights when the P147-30 is being remotely controlled from a P148 effects interface.

Input Controls

There are two sets of LUMA, BLACK, and CHROMA input level controls - preset, and user-operated. The presets are screwdriver-operated controls immediately below the panel annotations, and are normally set to give correct levels from standard 1V video inputs. The system defaults to these controls on power-up and when the CAL button is activated. The user-operated controls are selected when the CAL button lamp is off, and are set as necessary to accommodate signals of non-standard level. Both sets of controls have identical effects on their respective parameters.

It is advisable to set input levels using a waveform monitor or oscilloscope at the output.

LUMA

LUMA adjusts the gain of the input video amplifier from zero to about +6dB to obtain the correct level prior to A/D conversion. If the gain is set too high for the applied signal, the OVER indicator above the control will light. The LUMA control should be backed off until this indicator lights only very occasionally if at all. If the gain is set very high then peak whites, and possibly the black level, may be clipped, when streaking may occur. Correct black level before setting luma gain.

CHROMA

CHROMA adjusts the gain of the input chroma amplifier from zero to about +6dB to obtain the correct level prior to A/D conversion. If the gain is set too high for the applied signal, the OVER indicator above the control will light. The CHROMA control should be backed off until this indicator lights only very occasionally if at all. If the gain is set too high, chroma clipping may occur.

BLACK

Sets the reference black level of the incoming video independent of luma gain. This may be set most accurately if a black burst is applied to the video input. Correct the LUMA gain after adjusting black level.

Input Control Pushbuttons

The pushbuttons described below incorporate a built-in LED which, when illuminated, indicates that the function is active. On units up to serial number 21240, the buttons have no effect if the P147-30 is being operated remotely from an associated P152 Maurice controller, as indicated by illumination of the REMOTE indicator. On units subsequent to this, the buttons operate even if the REMOTE indicator is on.

BYPASS

Operation of the switch de-energises the internal bypass relay, which then connects the INPUT VIDEO signal directly to the MAIN VIDEO OUTPUT. The unit automatically assumes this state with no mains power applied.

CAL

The CAL button selects the controls used for setting input levels. When the button lamp is illuminated, all three main input controls (LUMA, BLACK, and CHROMA) are disabled and input level is placed under control of the screwdriver-operated presets immediately below them. The unit assumes this state on power-up. When the calibrate function is defined remotely, the indicator flashes.

ERROR OFF

ERROR OFF disables all error detection as set on the switches located on the error control board RP4. It is useful for viewing signals from noisy sources and from VTRs in shuttle mode.

DOC

DOC selects and deselects the drop out compensator facility. When selected, the drop out compensator will cause a freeze state unless the off-tape RF signal fed to the rear panel HET socket is above a preset threshold. This threshold can be adjusted by a screwdriver-operated control below the DOC switch around a preset level set by an internal control (see page 3-8).

Effects Controls

PIX

The PIX control is a rotary switch enabling selection of 14 levels of horizontal pixelation from 114 elements (fine) to 16 elements (coarse) per line. The effect is produced by a sample-and-hold technique, and because of its nature some horizontal off-setting of the pixelated picture occurs. This is normal.

QUANT

The QUANT (quantization) rotary switch produces a solarization effect by reducing the resolution of luminance A/D conversion from its normal 7 bits (128 discrete levels). The switch has 7 positions which remove the conversion bits as shown below:

OFF - all 7 bits operative - 128 levels normal operation

1 - 4 most significant bits only - 16 levels normal operation

2 - 3 most significant bits only - 8 levels normal operation

3 - 2 most significant bits only - 4 levels normal operation

4 - 1 most significant bit only - 2 levels normal operation

5 - MSB only missing - 64 levels to 1/2 amplitude

FCI

In the FCI (false colour imaging) mode, the original chroma signals from the input signal are not used. Instead, the various luminance levels in the picture are translated into false colours by reference to colour look-up tables stored in ROM. Four alternative colour schemes are provided including one with saturated primary and secondary colours only.

GRAB RATE

GRAB RATE operates in conjunction with the MULTIGRAB and FREEZE buttons to set the time interval between automatic frame store updates in a manual freeze. On the 0 setting the grab rate is equal to normal field rate, giving a normal real-time output. With the control at 10 the interval between successive pictures is around ten seconds. Note that the graduation marks on the control are not intended to give an accurate indication of time interval.

Effects Pushbuttons

The pushbuttons described below incorporate a built-in LED, which, when illuminated, indicates that the facility is active.

EFFECTS

EFFECTS acts as a master enable/disable switch for whatever combination of pixelation, quantization and false colour imaging is set up on the associated controls. Switching is completed during the field blanking period of the output video, eliminating the possibility of mid-frame disturbances.

GRAB

Operation of the GRAB button when the system is in manual freeze mode updates the frame store with a single new frame from the incoming video.

MULTI GRAB

MULTI GRAB activates an automatic strobe effect in which the (manually frozen) output picture is updated with single frames from the incoming video at a rate determined by the associated GRAB RATE control. The button LED flashes at the same rate.

FREEZE

This gives an immediate freeze frame. Both its own LED and that of the GRAB button are illuminated to indicate that the freeze is manual and that consequently the grab button is active.

The freeze button LED will light automatically whenever an input signal error results in a freeze. In this state, grab will not operate so the grab button LED remains off.

FREEZE FIELD

This causes the picture in a manual freeze to be derived from just one field of the frozen frame, and is used to eliminate inter-field jitter. The field is used twice to produce a fully interlaced frame. This halves the vertical resolution.

The button LED is illuminated whenever the function is selected, but there is no effect on the output until a manual freeze is initiated.

Output Control Pushbuttons

FIELD 1 and FIELD 2 enable the non-frozen output video to be derived from just one field of each frame. This can be useful for masking certain fault conditions - the effect of a clogged video head, for example. It also has applications such as de-multiplexing the output of CEL's P154 video multiplexer.

INSTALLATION

Mounting

The P147-30 is designed for standard 19" rack mounting (conforming to DIN 41494), occupying 3U (132.5mm) of rack height. All external connections are located at the rear of the unit, whilst all operator and preset controls are accessible from the front.

Ventilation

Ventilation slots are provided in the top and bottom of the case, and these should not be obstructed.

When fitted into an enclosed rack or equipment bay, please ensure that there is a free flow of ventilation particularly around the power supply unit at the rear of the P147-30. An accessory fan unit (F147) is available for use in areas with unusually high ambient temperatures. Full details are available from your distributor.

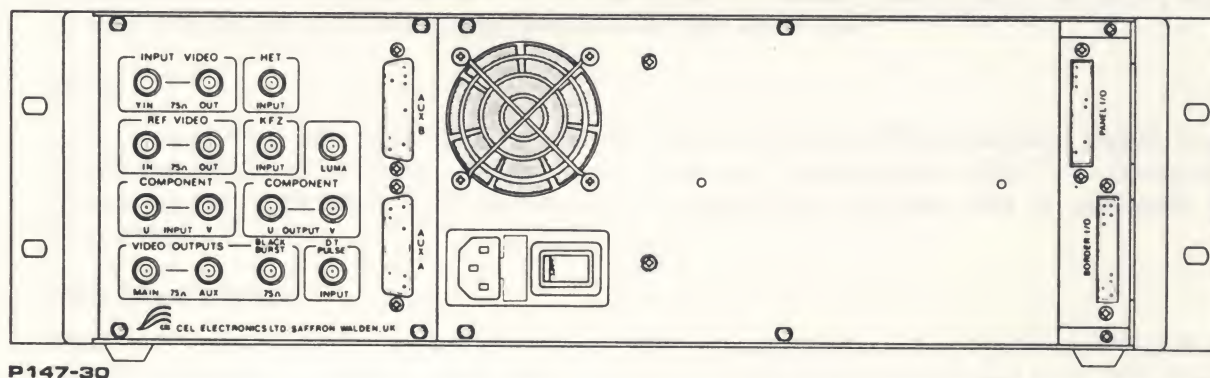
Care should be taken that heat generated by the unit (mainly at its rear) cannot affect adjacent items of equipment.

Note:

Where the unit is installed in a system that includes a P148, it is recommended that the P148 is fitted directly below the P147-30. Forced venilation from the P148 will assist ventilation of the P147-30.

Connection

Connection of the unit is dependent on the precise system application, but general recommendations are given for the various rear panel connectors below, and these should be observed.



Input Connectors

POWER

Mains power is connected via a standard I.E.C. 3-pole connector which incorporates a fuse holder and the main on-off switch for the unit. The fuse is a 1 amp quick blow and a 500mA or 600mA slow blow (when a dual fuse holder is fitted).

The P147-30 is normally supplied set to the correct mains supply voltage (240, 220 or 110) according to the market. Provision is made internally for reselection of voltage. Please contact your dealer for details.

INPUT VIDEO/Y IN

This socket accepts the input video signal to be processed by the P147-30. On units fitted with the standard decoder, the signal should conform to the appropriate TV standard. Where the optional dual-standard decoder is fitted, the input can be either a composite video signal of the standard selected during installation (see page 3-5), or the luminance (Y) component of component source. In all cases the standard amplitude for the signal is 1V p.p. (700mV video, 300mV sync).

If the (non-synchronous) video input signal is not to be looped to other equipment which is itself terminated, the loop-through socket must be terminated in 75 ohms. Failure to do this will result in overload of the input video amplifier causing over-modulation (although this will not cause any damage).

COMPONENT (U and V inputs)

These sockets accept component analogue chroma signals (700mV p.p.) if a luminance only signal is detected at the input video or the decoder is deliberately switched to the component video input mode. This is achieved by switches on the RP1 board. Details are given under User Presets.

REF VIDEO

Whether or not an external reference is used, the reference video loop through socket must always be terminated in 75 ohms, either directly or via a terminated equipment chain. Studio/station black burst or colour bars are preferred as a reference, and the signal should be of the highest possible quality as its stability will have a bearing on the overall performance of the P147-30.

HET

HET provides an input socket for the direct off-tape heterodyned signal (r.f. envelope) which is required to enable the drop out compensator (DOC) to function. Please check with your VTR instructions to ascertain whether this is available in your system.

KFZ (Key) INPUT

The KFZ socket serves a dual function. Its main use is as a key generator input to provide video-rate freezing of sub-portions of the picture as defined by a TTL low-active key signal. The horizontal resolution of this feature is limited to 1/28th of the displayed line - i.e. approximately 1.9 micro-seconds - while the vertical resolution is one TV line.

The secondary function of the socket is to provide an output for setting up the drop out compensator system. This function is fully described on page 3-8.

DT PULSE INPUT

This is a field synchronizing input, for use with VTRs equipped with dynamic tracking. Please consult your VTR manual and dealer with regard to use.

Output Connectors

VIDEO OUTPUTS

The MAIN and AUX video outputs should be applied to correctly terminated loads to achieve the proper output levels and performance. If the AUX video output is not used, it may be left unconnected and unterminated without degrading the performance of the main output.

There is a bypass facility which routes the input video directly to the main output in the event of mains failure or manual activation. Care should be taken to ensure that equipment such as VTRs connected to the main video output cannot be disrupted by this bypass function. If in doubt always use the auxiliary output on which the bypass does not operate, but note that the signal will be lost in the absence of power to the P147-30, and that the BYPASS switch on the front panel will have no effect.

BLACK BURST

The black burst output provides a colour black signal referenced to the P147-30's internal SPG. Where a reference video input is connected, the SPG, and therefore the black burst, is synchronous with the reference source. Black burst may be used as a genlock reference to other equipment, where it should be correctly terminated.

COMPONENT OUTPUTS

As an option, three additional BNC sockets can be provided for component (Y, U, V) video output as an alternative to the composite outputs. This facility requires the provision of an additional buffer PCB mounted in the rear of the unit. Please consult your dealer for details.

Control Inputs

AUXILIARY CONNECTORS (A and B)

These sockets allow for expansion of the digital effects capability of the P147-30 by connection of a CEL effects controller or interface. For full details of their use, refer to the handbooks of the CEL units P152 or P148.

BORDER I/O and PANEL I/O

These two 26-way IDC connectors are provided exclusively for interface to the CEL P148 digital effects interface. Respectively, they enable the P148 to produce adjustable coloured borders on the output picture, and to enable remote operation of the P147-30 front panel by the Maurice P152 digital touch screen controller.

Border Card Removal (For operation without P152/P148)

When the P147-30 is used as a stand-alone unit, the border card (if fitted) should be removed. The card occupies slot 17 in the P147-30 card frame which is accessible after removing the six front panel securing screws and withdrawing the panel. Take care not to strain the front panel connecting cables during this operation.

Power Up

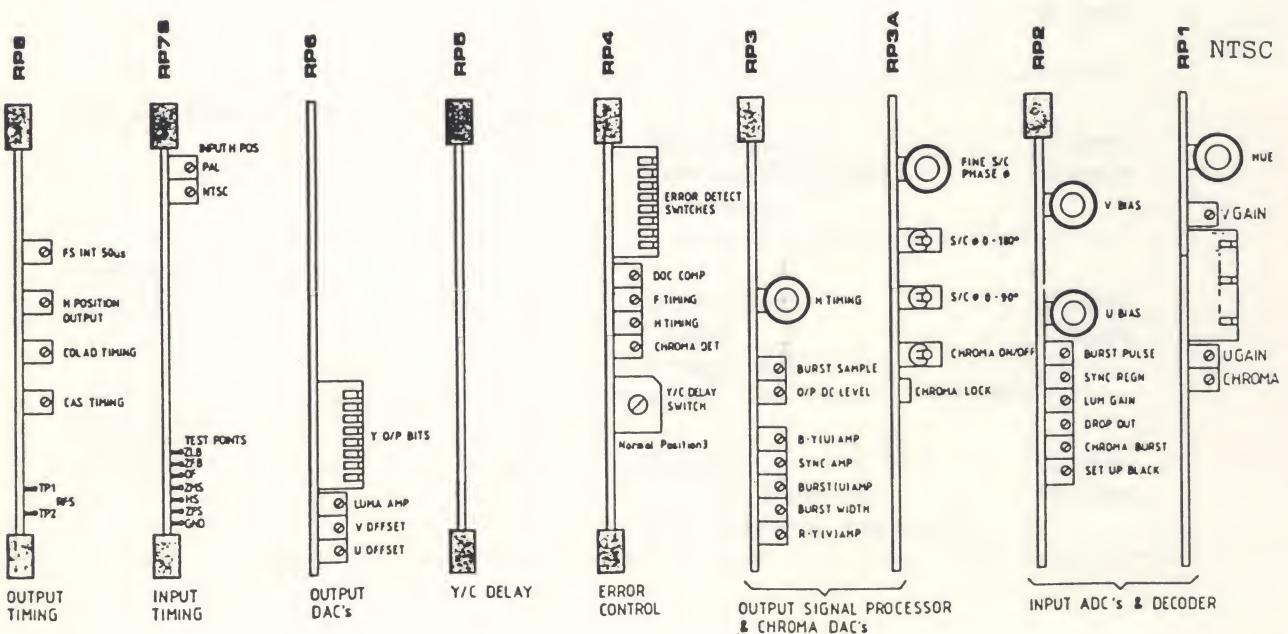
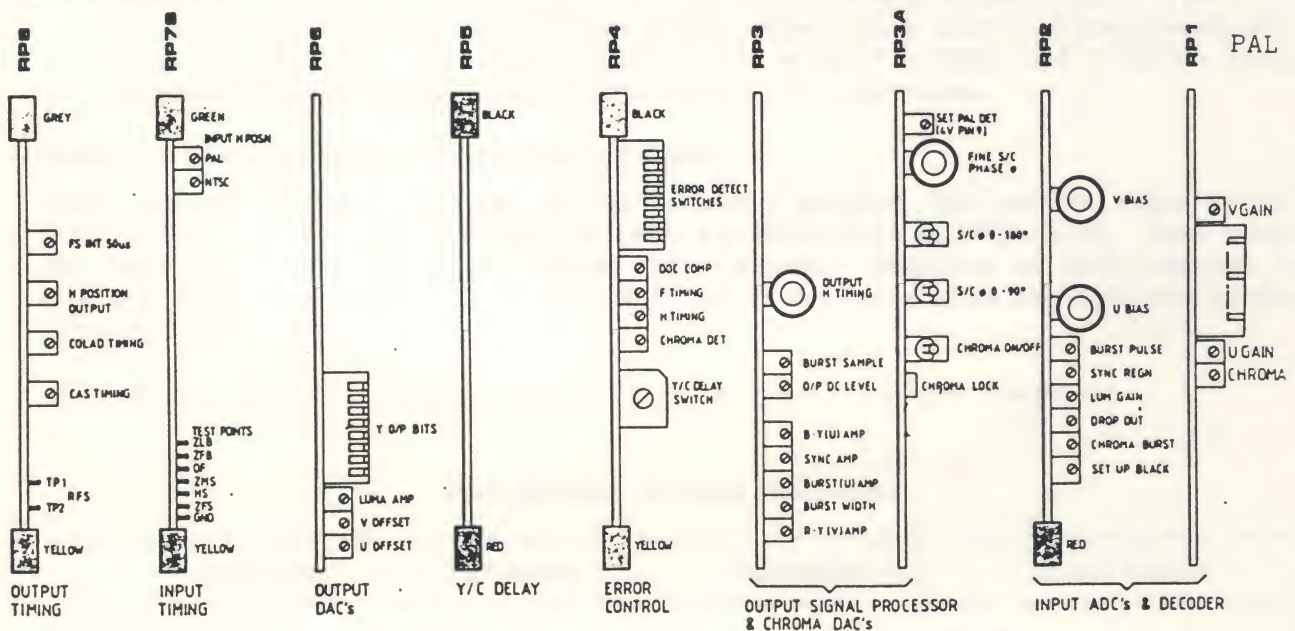
If power is applied to the unit without a video connected, the output will assume a static random state. The pattern generated will consist of mauve and green stepped bars at maximum chroma excursions. Only the POWER and CAL indicators will be lit. As soon as a satisfactory video input is applied the VIDEO I/P lamp will light and the signal will appear at the unit's output, synchronized either with the reference video or, if this is not present, with the internal SPG.

Setting Up User Presets

The P147-30 is accurately set up prior to despatch and, provided correct inputs of normal level are applied, it will operate without any internal adjustment. However, there are a number of preset switches and controls on the unit which allow for certain operating characteristics to be set according to requirements, and enable the unit to be adjusted for optimum performance with the particular reference video system. All such controls are accessible after removing the front panel. The paragraphs below describe the user presets, in numerical order of the boards on which they are fitted, and provide instructions for their adjustment.

IMPORTANT NOTE

MANY OF THE PRESETS ACCESSIBLE WITH THE FRONT PANEL REMOVED VITALLY AFFECT THE PERFORMANCE OF THE P147-30 AND CAN BE CORRECTLY ADJUSTED ONLY BY A QUALIFIED SERVICE ENGINEER WITH ACCESS TO THE P147-30 TECHNICAL MANUAL AND THE APPROPRIATE TEST EQUIPMENT. CARE SHOULD BE TAKEN TO TOUCH ONLY THE CONTROLS COVERED IN THESE INSTRUCTIONS.



Board 1 - Chroma Decoder (Single-standard type)

There are two versions of the single-standard decoder for operation on the PAL and NTSC systems. The PAL decoder contains no user-adjustable presets. The NTSC version contains a HUE control for input hue adjustment.

HUE (NTSC versions only)

With the unit running in its stand-alone non-reference mode, HUE sets the sub-carrier phase relative to the input, and thereby adjusts the overall hue of the picture. It should be adjusted only if a source of colour bars is available, ideally in conjunction with the vectorscope.

When the P147-30 is in its reference mode, then the sub-carrier phase control on board 3A will also affect the perceived output hue values. It is important that the input hue control has been correctly adjusted before attempting to set up the reference sub-carrier phase on board 3 accurately.

The two screwdriver preset controls on the decoder should not be adjusted.

By using a combination of hue and CHROMA (Front Panel) adjustments it is possible to correct for a wide range of colour errors. However, it must be remembered that these controls affect the whole picture. In the event of a single area of colour being incorrect it is not possible to use these controls for correction.

Board 1 - Chroma Decoder (Dual-standard type)

There are two versions of the optional dual-standard decoder. One provides selection for PAL or SECAM; the other provides selection for NTSC 3.85 or NTSC 4.43. Both allow for component video as an alternative input source. Selection on both versions is performed using an 8-pole DIL switch SW1. The tables below show the functions of the individual poles of SW1.

Note: In the tables O = Open or off; C = Closed or on; X = Position irrelevant.

PAL/SECAM Decoder Selections

| Function | SW1 Poles | | Selection | Initial Pos'ns |
|------------------------------|-----------|---|-------------------------|----------------|
| I/P standard select | A | B | | |
| | O | O | Auto select | A open |
| | O | C | PAL | B open |
| | C | O | SECAM | |
| SECAM ident mode | C | D | | |
| | X | O | Auto select | C open |
| | O | C | Vertical ('bottles') | D open |
| | C | C | Horizontal | |
| Coded/component input select | E | F | | |
| | O | X | Auto select | E open |
| | C | O | Coded | F open |
| | C | C | Component | |
| Colour kill/ burst lock | G | H | | |
| | X | O | Normal | G open |
| | O | C | Locked, burst on | H open |
| | C | C | Free-running, burst off | |

For use as a synchronizer, it is normal to 'freeze out' all incoming signal disturbances. In this case all switches should be on.

With U-Matic type machines there may be occasional horizontal sync jumps or possibly missing horizontal sync. To avoid freeze under these circumstances switch off switches 1 and 3 and possibly 5.

The use of certain VTRs in shuttle may result in field sync disturbances or loss. To avoid freeze switch off switch 2.

Use of the unit with a monochrome or component Y, U, V signal necessitates switch 5 being off.

In the event of undesirable freezes occurring always try switching off one or more of the error detection switches.

If an error is detected while the unit is in a manual freeze field condition, the displayed field may be changed. To prevent this, set switch 8 to off.

Y/C DELAY

This control gives adjustment of Y/C delay in 7 steps of 77nS each. It is initially set at position 2 or 3, but can be adjusted as dictated by the reference system.

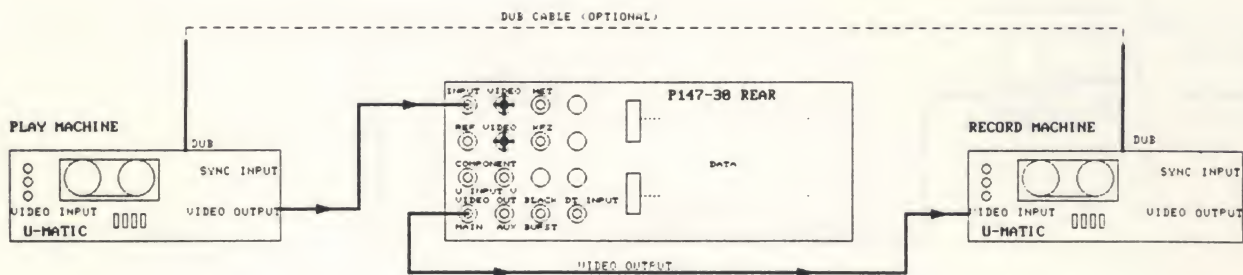
DROP OUT COMPENSATOR

The KEY socket on the rear panel can be used as an output to monitor and adjust the operation of the drop out compensator (DOC), the function of which is to detect the off-tape RF signal from suitable VTRs and initiate line freezes when it falls below a pre-set threshold. Setting up the DOC involves adjusting the level of this threshold.

Connect the off-tape RF signal from the VTR to the HET socket, and load the VTR with a tape containing known typical dropouts. Monitor the KEY socket using an oscilloscope set to observe TTL levels. The output will be high when the RF from the tape is satisfactory (i.e., above the set threshold). A low indicates a partial freeze resulting from a drop out. This may persist for less than a line, so there is usually no visible effect on the picture.

Set the uppermost screwdriver preset on board 4 (DOC COMP) for the required threshold level. This should be chosen to give a comfortable margin of acceptance of RF levels, while still reliably masking significant drop outs by means of partial freezes. As the control is turned anticlockwise, the RF level required to prevent freezes is raised, and so progressively smaller drop outs will be detected. If the control is turned too far, the whole field will be frozen on detection of a drop out.

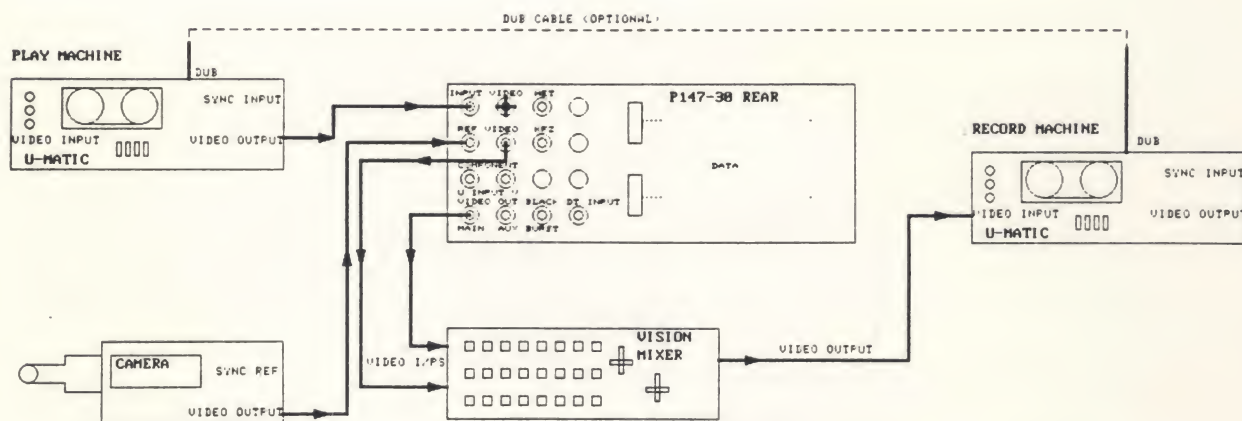
The front panel DOC button allows the drop out compensator to be temporarily disabled, while the preset below the button varies the threshold around the level set by DOC COMP as described above.



1. Simple Two-machine Editing or Copying

Here the P147-30 is in use primarily as a stand-alone time base corrector. Points to note are that no reverse or advance sync information is provided to the play VTR and that the P147-30 is in this case not externally referenced (although, of course, it could be). Use of the P147-30's internal drop out compensator is entirely optional, and to simplify set-up arrangements CEL recommend its use only where there is no such facility provided by the play VTR itself - as is the case with some reel-to-reel machines.

Most editing U-Matic VTRs provide a colour dub facility, and we recommend that this is adopted during the editing process, with the P147-30 used only as and when required to generate digital effects. Final play out via the P147-30 after all editing is complete will correct any accumulated sync errors in one operation. If preferred (or if a dub facility is not available) it is permissible to edit via a fully active P147-30. However, if the material is free from disturbances and multi-generative work is envisaged, it is preferred that the P147-30 be left in BYPASS during editing except when required to provide special effects. Again, any accumulated sync errors will be completely corrected by a single final play out.



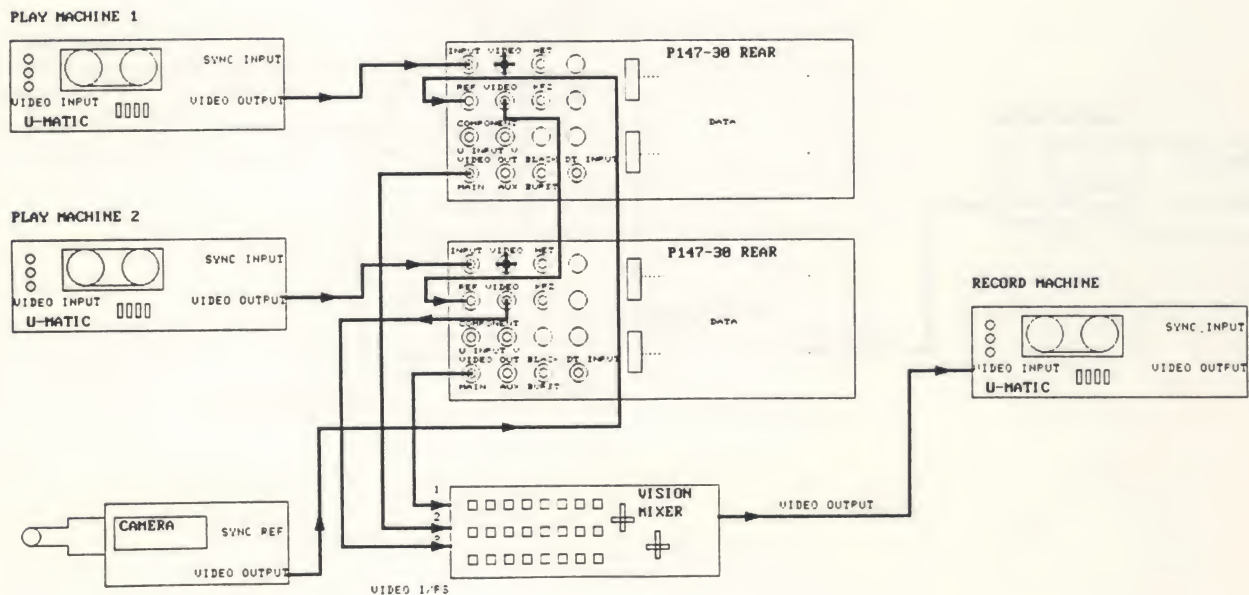
2. Two Machines Plus External Source

In this example, the system has been expanded a little to include a vision mixer and an external source - a camera in this case, although any externally-lockable source could be substituted.

As in the previous example, for the sake of noise limitation we recommend that the VTR's colour dub facility is used wherever possible during copying and editing, with the mixer and P147-30 being used only when their facilities are needed.

An advantage of ensuring that the connections between the camera, vision mixer, and P147-30 remain constant is that once H-timing and sub-carrier phase have been correctly set, they will not require readjustment to accommodate additional equipment.

In this example, the P147-30 is provided with an external reference in the form of black burst from the mixer, which is also looped out to genlock the camera. It is generally preferable to operate the P147-30 with an external reference and any stable source providing black burst as a minimum will normally suffice.

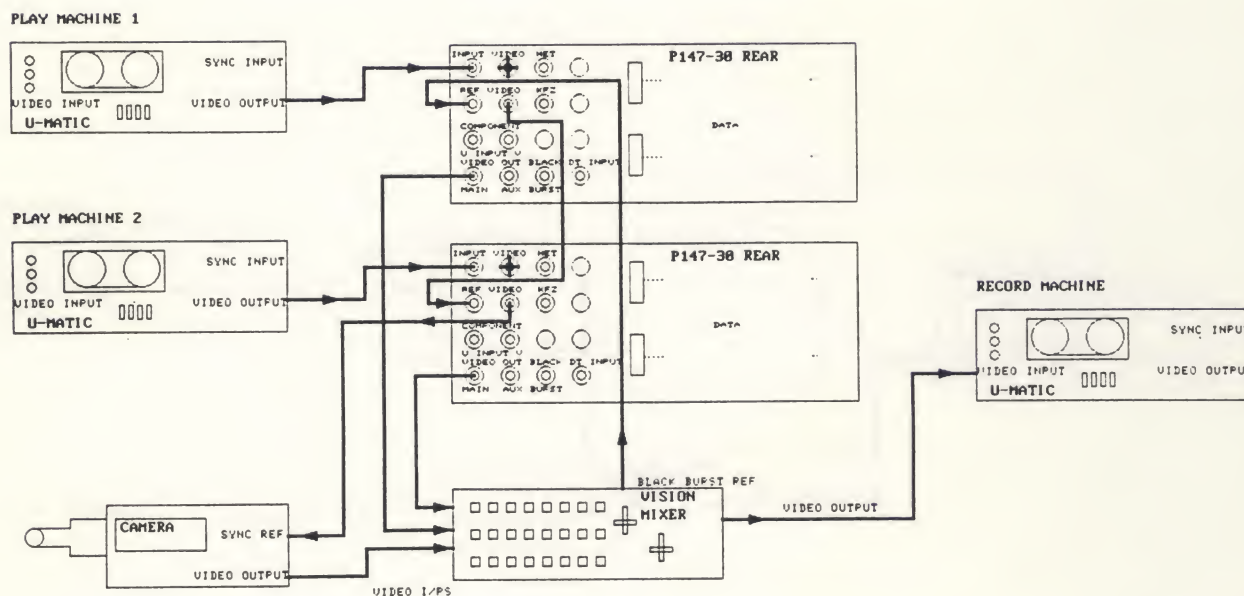


3. Two Machines Plus External Source with External Source as Locking Reference

This configuration is essentially the same as Example 2 except that the external source video is used as the reference against which the P147-30 corrects the play VTR output. This is useful where the mixer does not provide a reference output, or where the output is unsuitable.

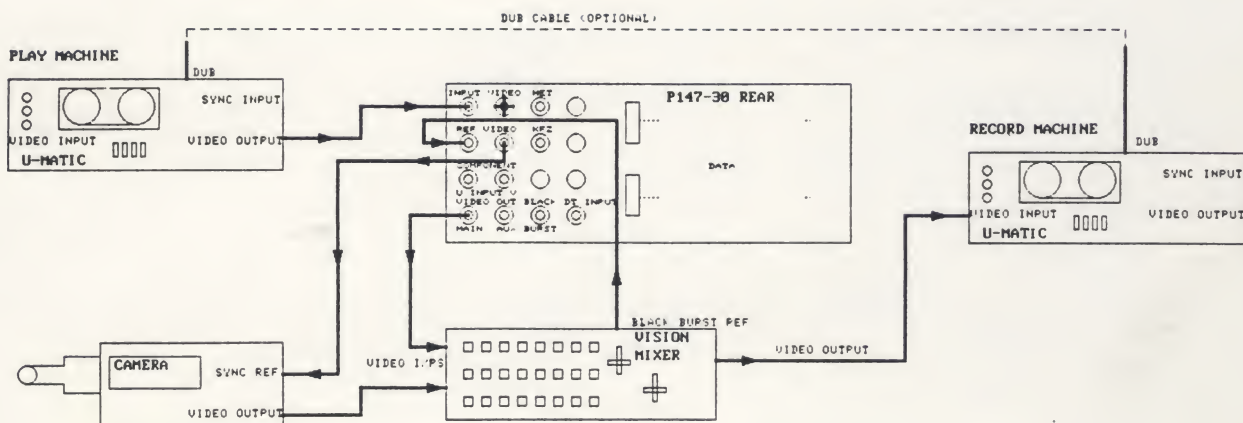
If the external source is removed, the P147-30 will automatically revert to its own SPG for output timing and its functioning will remain intact. It may, however, be necessary to rearrange the inputs to the mixer, as some mixers reference themselves to whatever is presented at their channel 1 input.

Incidentally, the P147-30's black burst output provides a convenient solution to a problem inherent in many simple vision mixers - that of having no inbuilt provision for fade-to-black. Provided the mixer has sufficient capacity, the output can be fed into a spare channel as a source of black.



4. Two P147-30s Plus Vision Mixer

This arrangement has similarities with Example 2, but now with two P147-30s synchronizing inputs from separate VTRs. Similar rules apply here as in previous examples, but the reference arrangements for the P147-30s should be noted. A single genlock source - mixer black burst in this case - is looped through both P147-30s and to other genlockable equipment. The use of black burst from one P147-30 to another is not recommended.



5. Two P147-30s Plus Vision Mixer with Third Source as Locking Reference

This example uses the same general configuration shown in Example 4, but with the reference derived from the external source video. If the external source is removed, it will be necessary to re-patch so that the second (lower) P147-30 is referenced from the black burst output of the first (upper) one. The first unit then becomes the master reference for the whole system. However, this arrangement is not generally recommended.